



GEOHERMAL RESOURCES

Geothermal resources: overview

Rotorua's geothermal resources contribute to a unique sense of place. Maori settlers were attracted to the outstanding geothermal features at Ohinemutu, Ngapuna and Whakarewarewa, while later European arrivals saw the potential for a world-class spa resort on the shores of Lake Rotorua. Rotorua's geothermal fields are part of the larger Taupo Volcanic Zone and extend further than just these well known sites.

Balancing protection with use of geothermal resources has always been a key issue. Unsustainable use has at times resulted in a depletion of some features associated with the resource, most obviously the Pohutu Geyser. Stringent controls introduced during the 1980's have allowed some of these features to replenish.

The Geothermal Resources theme includes monitoring of one indicator.

How are we going?

Geothermal resources in the Rotorua city and urban area are used mainly for domestic heating and commercial spas and pools. Extractive uses prior to 1986 were detrimental to the health of the Rotorua Geothermal Field. Monitoring over the past 20 years by Environment Bay of Plenty suggests that the field has substantially recovered and has reached a state of equilibrium. This is thought to be attributed to better management including closure of bores, re-injection methods and insulation for more efficient use of the resource.

The issues facing the geothermal field under the city are different to those that affect the geothermal fields in the rural environment. In rural areas geothermal fields have suffered from land drainage for farming practices.

There is increasing pressure to explore geothermal use again as it is considered a resource from which 'green' energy can be sourced and can be renewable if it is managed in a sustainable manner.

What are we doing?


Environment Waikato and Environment Bay of Plenty are responsible for the management of geothermal resources.

Environment Waikato's Regional Plan now protects the Waikite-Waiotapu-Waimangu and Te Kopia fields. Other fields are allowed some level of development or research. For large-scale development to occur in a Development Geothermal System, it must first be peer reviewed by a panel of experts. Re-injection of geothermal fluid is encouraged through policies and rules.

It is anticipated that Environment Bay of Plenty's review of the Rotorua Geothermal Plan will be completed by the time of the next state of environment reporting phase.

The Geothermal Safety Bylaw 1988 has been reviewed as a result of the Local Government Act 2002. Its main purpose is to ensure that geothermal bores and pools are operated and used in a safe manner.

Geothermal resources indicator is:

Indicator	State
Geothermal field water levels and surface feature activities	





Purpose of indicator

This indicator monitors water levels in well M16, near Whakarewarewa, and surface feature activity from the Okianga Geyser. From this information an indication of the health of the geothermal field can be derived.

Current information and trend

Rotorua urban geothermal field

There are 1524 known and recorded geothermal features in and around Rotorua city alone. Since the closure of most bores in 1986 Environment Bay of Plenty monitoring suggests that the geothermal field is recovering and has now reached a state of equilibrium.



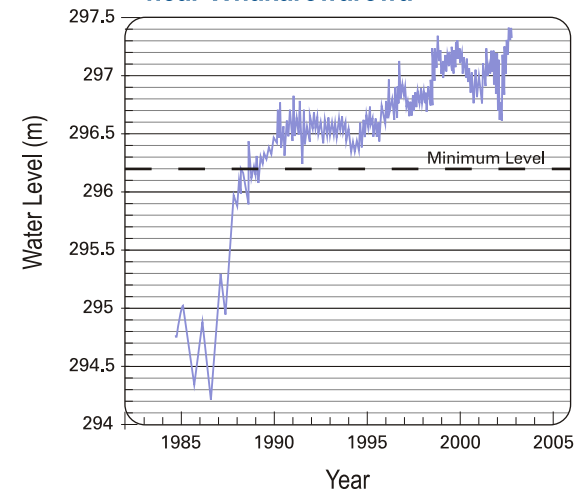
Figure 2.1 shows monitoring of water levels in Well M16, near Whakarewarewa. Prior to 1986 water levels were declining. From 1986 to 1992 trends show that water level recovery took place. From 1992 to 1999 the field and surface features showed recovery. Between 1999 and 2005 the field displayed dynamic equilibrium with annual seasonal fluctuations.

The closure of bores has also influenced geyser eruptions. The Okianga Geyser located at Whakarewarewa rarely erupted in the 1980s. Since 2004 it has displayed frequent daily eruptions (Figure 2.2).

Geothermal fields in the rural area

Monitoring by Environment Waikato (Table 2.1) shows that the number of active springs at Horohoro, Te Aroha and Waitapu has remained the same, while a small number at Reporoa and Waikite Valley have become inactive, mainly due to the drainage of land for farming, and through natural variation. At Orakeikorako, a number of sinter springs and geysers were flooded in 1961 following the construction of the hydro electric dam which formed Lake Ohakuri. Since then, numbers have remained stable.

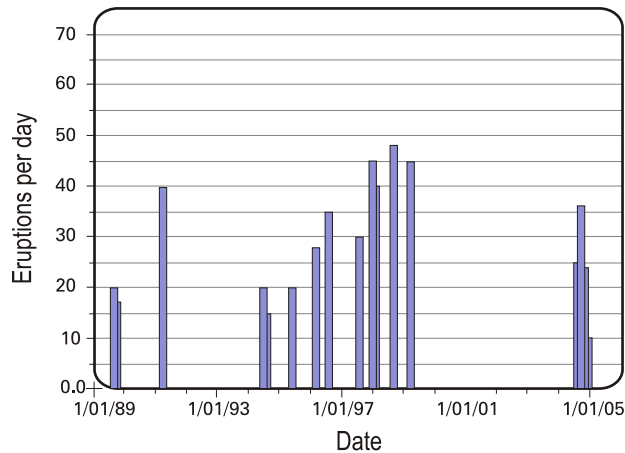
Figure 2.1 Water level monitoring in Well M16, near Whakarewarewa



Source: Environment Bay of Plenty 2005



Figure 2.2 Number of eruptions per day from Okianga Geyser



Source: Environment Bay of Plenty 2005



Table 2.1 Active springs and geysers

Location	Springs			Geysers		
	Historical-prior to 1995	Active-1995 - 2000	Trend	Historical-prior to 1995	Active-1995 - 2000	Trend
Horohero	2	2	→	0	0	→
Orakei Korako	450 (in 1961)	100	↓	105 (in 1961)	35	↓
Reporoa	5	2	↓	0	0	→
Te Aroha	1	1	→	0	0	→
Waikite Valley	9	10	↑	2	2	→
Waiotapu	9	9	→	5	7	↑

Source: Environment Waikato, Geysers and Sinter Springs web data, 2007

What the community said

More than half of the community (54%) thought geothermal resources in Rotorua were in a healthy state. Almost half (46%) thought that geothermal resources had been managed wisely in the past five years and 24% thought this was due to reduced access and/or increased controls.

A majority (70%) of respondents agreed that geothermal resources were very important or important. The tourism value and the unique geothermal features were deemed to be of most importance.



MAKING A DIFFERENCE WHAT YOU CAN DO TO HELP YOUR ENVIRONMENT



ACTIONS YOU CAN TAKE



In 15 minutes

- ✓ Use less power. Some of the energy provided to Rotorua is produced at the geothermal power stations just outside the Rotorua district, the closest being the Ohaaki field. All of the geothermal fields from White Island to Tongariro are part of the greater Taupo Volcanic Zone. Because of this connection, the health of one field may affect the health of others.



In 1 hour plus

- ✓ If you use geothermal water or heat, insulate your feed and return lines to minimise atmospheric heat loss from production bores. Re-inject, or use a down-hole heat exchanger.
- ✓ If there are geothermal areas on your property find out if they are significant, worth protecting or an area for rehabilitation. Some help is available from Environment Waikato and Environment Bay of Plenty.

WEBSITES FOR MORE INFORMATION AND IDEAS

Information about geothermal resources

Environment Waikato
www.ew.govt.nz

Environment Bay of Plenty
www.envbop.govt.nz

Information about energy and renewable energy

Energy Efficiency and Conservation Authority
www.eeca.govt.nz

New Zealand Geothermal Association
www.nzgeothermal.org.nz

Ministry of Economic Development
www.med.govt.nz